Specifications of Main Unit

Basic Specifications

•Input

Type: Plug-in module (each unit has a built-in A/D converter)

Number of slots: 8 (DL708E) ,16 (DL716)

Different modules can be used in combination with each other.

•Horizontal

Maximum record length

(DL708E using two channels)

400 k words (standard)
4 M words (/M1 option)
8 M words (with /M2 option)
16 M words (with /M3 option)

(DL716 using four channels)

1 M word (standard)
8 M words (with /M1 option)
32 M words (with /M2 option)
64 M words (with /M3 option)

Time-axis accuracy: ±0.005%

Sweep time

100 k words/channel model: 500 ns/div to 50,000 s/div (1/2/5 steps)

Other models: 500 ns/div to 100,000 s/div (1/2/5 steps)

•Acquisition Modes

Normal: Maximum sampling rate: 10 MS/s

Envelope: Holds peak values at maximum sampling rate, regardless of Time/div.

Box average: Increases resolution of A/D converter to a maximum of four bits.

History memory: Holds the past 1000 screenshots.

Sequential store: Specity between 2 and 1000 storage operations.

Roll: Works at maximum sampling rate of 100 kS/s (DL708E) or 200 kS/s (DL716).

•Triggers

Modes: AUTO, AUTO-LEVEL, NORMAL, TIME

Pretrigger: 0% to 100% (in 1% steps)

Sources: INT (1 to 8 channels for DL708E, 1 to 16 channels and LOGIC1, LOGIC2 for DL716), EXT, LINE

*LINE trigger cannot be used with the DC model (701831).

Slopes: Rise, Fall, Both

Types: Edge trigger, event/pattern trigger, A → B (n), A Delay B, Edge on A, Pulse Width Trigger, B > Time, B < Time, B Timeout, window trigger, OR trigger

∗When you select LOGIC1, LOGIC2 or EXT as trigger source, only edge trigger is available.

Time trigger: The measurement-start time and intervals can be specified.

•Screen Refresh Rate

Using 1 channel: Maximum 30 Hz

Using 8 channels: Maximum 20 Hz (DL708E)
Maximum15 Hz (DL716)

Using 16 channels: Maximum 10 Hz (DL716)

Display

Display: 10.4-inch TFT color LCD

Screen size: 211.2 mm (W) × 158.4 mm (L)

Total number of pixels: 640 × 480 (The LCD may contain approximately 0.02% defects among all the pixels in the screen.)

Number of waveform display pixels: 501 × 432

Display modes: Split: Single, Dual, Quad, Hexa, Octal
Zoom: Main, Main & Z1, Main & Z1 & Z2, Z1 only, Main & Z2, Z2 only, Z1 & Z2
(Z1 and Z2 are abbreviations for zoom areas 1 and 2, respectively)
X-Y: TY, XY, TY & XY

Accumulation display: PERSIST: Accumulation in one color
COLOR: Infinite accumulation in eight colors representing different levels of data frequency

Maximum number of displayed traces

DL708E: 24 traces (during zooming; 8 captured waveforms + 16 enlarged waveforms)

DL716: 48 traces (during zooming; 16 captured waveforms + 32 enlarged waveforms)

X-Y display

DL708E: Any one of the following can be specified for the X-axis: CH1-CH8, MATH1, MATH2.

DL716: Any one of the following can be selected for the X-axis: CH1-CH16, MATH1-MATH8. (The rest of the above are simultaneously displayed on the Y-axis.)

Recorder

•Built-in Printer

Printing method: Thermal line-dot printing

Dot density: 8 dots/mm

Paper width: 112 mm

Effective recording width: 104 mm

Recording speed: Maximum 20 mm/s

Real-time recording: Can be used on a time axis slower than 500 ms/div.

•Real-time Hard Drive Recording

(The optional internal HDD is required to use this function.)

Data capacity

DL708E: Maximum 128 M words

DL716: Maximum 512 M words

Maximum time-axis: 1 s/div

Maximum sampling rate

DL708E: 10 kS/s (using 8 channels simultaneously)
100 kS/s (using one channel only)

DL716: 20 kS/s (using 16 channels simultaneously)

DL716: 200 kS/s (using one or two channels)

Restriction: This function cannot be used in combination with real-time printing, average, or sequential store.

Inter-channel computation

Record length used for calculations

DL708E: Maximum 100 k words (using MATH1 only)
Maximum 50 k words (using MATH1 and MATH2 simultaneously)

DL716: Maximum 400 k words (using MATH1 and MATH2 simultaneously)
Maximum 100 k words (using MATH1 through MATH8 simultaneously)

Maximum number of free definable calculation waveforms

DL708E: NA (standard; with /G2 option)
2 (MATH1 and MATH2)

DL716 : 2 (MATH1 and MATH2; standard)
8 (MATH1 through MATH8; with /G2 option)

•Standard

Operations: Addition, subtraction, multiplication, FFT, and phase shift

FFT

Type: Power spectrum (PS)

Number of points: 1000, 2000, 10,000 (using MATH1 only: DL708E, using MATH1 and 2: DL716)

Window functions: Rectangular, Hanning, Flat-Top

Start-point setting capability: Possible

•User define math function (optional)

Operations: Addition, subtraction, multiplication, division, ABS, SQRT, LOG, EXP, trigonometric functions, moving averages, differentials, integrals

FFT

Types: PS, LS, RS, PSD, CS, CH, TF

Number of points: 1000, 2000, 10,000 (using MATH1 only: DL708E, using MATH1 to 8: DL716)

Window functions: Rectangular, Hanning, Flat-Top

Start-point setting capability: Yes

Waveform Measurement Functions

•Cursors

Types

Marker: Two markers

Horizontal: Two horizontal cursors

Vertical: Two vertical cursors

H&V: Two horizontal and two vertical cursors

User def: Cursor measurement on the horizontal axis is displayed in a unit set by the user.

Cursor measurements: A marker is moved over the data, and the time and numerical value (corresponding to the measurement or calculation at the marker position) are displayed. Cursors other than markers are moved over the screen, and data on the screen are measured. Therefore, the resolution of such measurements depends on the screen resolution.

•Automatic Measurement of Waveform Parameters

Waveform parameters falling in a range set by cursors are measured.

Maximum number of measured parameters

DL708E: 8 (parameters can be set with respect to any number of pieces of data, but the total number of parameters must be 8 or less)

DL716: 16 (parameters can be set with respect to any number of pieces of data, but the total number of parameters must be 16 or less)

Measured items: P-P (Peak to Peak value), Max (maximum value), Min (minimum value), High (most

frequent high voltage value), Low (most frequent low voltage value), Avg (average value), Rms (root mean square), +Ovr (overshoot), -Ovr (undershoot), Rise (rise time), Fall (fall time), Freq (frequency), Period, +duty (High duty ratio), -duty (Low duty ratio), +Width (High pulse width), -Width (Low pulse width), Amp (amplitude), StdDev (standard deviation), Int1TY, Int2TY (area calculated TY), Int1XY, Int2XY (area calculated XY), Fdelay (time from trigger point to falling edge), Rdelay (time from trigger point to rising edge), Hist (voltage-axis histogram display)

•GO-NO GO judgment (DL716)

Parameter: Evaluation can be made using a combination of 16 parameters.
Zone: Evaluation can be made using a combination of maximum 4 zone.

•Snapshot

This function lets you keep the currently displayed waveform on the screen as a snapshot.

Screen Data Output and Saving (Copying) Functions

•Output to built-in printer

Formats

Normal	Outputs a hard copy of the screenshot.
Long*n	Outputs the displayed waveform enlarged by a specified magnification n. Supported magnifications (n values): ×2, ×5, ×10, ×20, ×50
Split	Sequential output of multiple traces (one at a time) to fill the entire paper width. (Use this format to output individual waveforms in a larger size when using multiple channels.)

•Output to GPIB interface, serial (RS-232) interface, floppy disk, internal HDD, external SCSI device

Formats: HPGL, ThinkJet, PostScript, TIFF (black and white), TIFF (color), BMP (black and white), BMP (color)

•Output to Centronics interface

Formats: ESC-P (black and white), ESC-P (color), BJ (black and white), BJ (color), LIPS, PR201, PCL5 (black and white), PCL5 (color), ESC-P2(ESC-P raster:Black and White), ESC-P2(color), (output covering several pages is supported)

Other Functions

•Keyboard function (DL716)

Assigns numerical keys to match the channel keys on the panel, enabling numerical input.

•Key protect function (DL716)

Locks the panel keys to prevent accidental entry.

•Backlight off function (DL716)

Allows the LCD backlight to be turned on and off.

External I/O

•Trig-IN/Trig-OUT

Connector type	DL708E: RCA pin jack; DL716: BNC
I/O levels	DL708E: CMOS level DL716: CMOS level (Trig-OUT) TTL level (Trig-IN)

•EXT clock IN (optional on DL708E, standard on DL716)

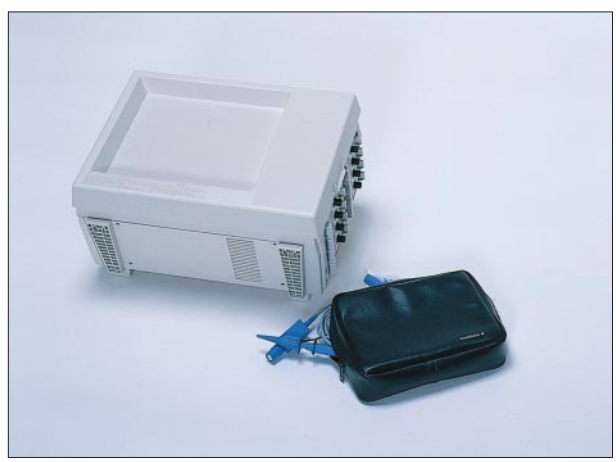
Time axis setting range	500 ns/div to 100 ks/div (in steps of 1, 2, and 5)
Time axis accuracy	±0.005%
Input connector types	BNC (DL716)/RCA pin jack (DL708E)
Input frequency range	Depends on module (see table below; in table, circles indicate input capability and X's indicate where inputting is not possible).

Module	Frequency range		
	Up to 1 kHz	1 kHz to 100 kHz	100 kHz to 1 MHz
701855/701856	×	○	○
701870/ DL716 extended logic	○	○	○
Other	○	○	×

Input levels	DL716: TTL level DL708E: CMOS level
Clock rise/fall time:	less than 2µs
Minimum pulse width	400 ns for both high and low (DL716/DL708E)

Transparent Protective Front Panel Cover (separately sold accessory photo: DL708E)

Soft Carrying Case (separately sold accessory for DL708E)



Opaque Protective Front Panel Cover
Soft case (for storing probes, etc.)
} (standard accessory for DL708E, DL716)

•VGA video signal output

Connector type	D-Sub 15-pin (VGA VIDEO OUT)
Output type	VGA compatible

•GP-IB interface

Electrical and mechanical specifications	Conforms to IEEE std. 488-1978 (JIS C 1901-1987).
Functional specifications	SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT0, C0
Protocol	Conforms to IEEE std. 488.2 1987.

•Serial (RS-232) interface

Connector type	D-Sub 9-pin
Standard	Conforms to EIA RS-232.
Baud rates	1200, 2400, 4800, 9600, 19200 bps

•Centronics interface

Connector type	DL708E:	Half-pitch 36-pin connector
	DL716:	Centronics connector (25-pin D-sub) compatible with IBM/PC
Standard		Conforms to Centronics.

•SCSI interface (optional on DL708E, standard on DL716)

(Note: Standard on DL708E systems with the optional 2.1-GB internal hard drive.)

Standard	SCSI (Small Computer System Interface), ANSI X3.131-1986
Connector type	Half-pitch 50-pin (pin type)
Connector pin assignment	Unbalanced (single-end)
Supported SCSI devices and conditions	
	HD drive: Drive formattable by the EZ-SCSI
	MO drive: Up to 640MB type which is formattable by the EZ-SCSI
	Zip drive: Iomega Zip drive compatible

•HP-GL Plotter Output (both GPIB and RS-232 interfaces)

•GO-NO GO Judgment Output (DL716)

Connector type	Modular jack
Output level	TTL level

•32-bit extended logic input (Optional on DL716.)

Number of inputs	32 (8 bits × 4)
Connector type	Half-pitch 26-pin connector × 4
Maximum record length	200 k words × 32 bits (standard models) 2 M words × 32 bits (models with "/M1" option) 8 M words × 32 bits (models with "/M2" option) 16 M words × 32 bits (models with "/M3" option)
Maximum sampling rate	10 MS/s
Compatible probes	700986, 700987

External Media

•Internal floppy drive

Number of drives	1
Size	3.5 inches
Capacity	640 KB, 720 KB, 1.2 MB, 1.44 MB (MS-DOS format)

•Internal hard disk drive (optional)

Number of drives	1
Size	3.5 inches
Capacity	2.1 GB (SCSI drive for DL708E), 9.2 GB (SCSI drive for DL716)
Windows compatibility	The internal hard disk drive can be connected to a PC running Windows 95, Windows98 or Windows NT via the SCSI interface.

General Specifications (for 701820/30/31)

Reference operating state ambient temperature	23±5°C
Ambient humidity	55±10% (RH)
Supply voltage and frequency tolerance	±1% of rating (following calibration after a warmup period of at least 30 minutes)
Storage temperature range	-20° to 60°C
Storage humidity range	20% to 85% RH (no condensation)
Operating temperature range	5° to 40°C
Operating humidity range	20% to 85% RH (printer off), 35% to 85% RH (printer on)
Battery backup	User settings and the clock are backed up by an internal lithium battery.
Battery live	Approximately 5 years (at ambient temperature of 23°C)

General Specifications (701820: DL708E)

Rated supply voltage	100 to 120 V AC (100 V power supply)model/ 200 to 240 V AC (200 V power supply model)
Allowed supply voltage fluctuation range	90 to 132 V AC/100 V power supply model/ 180 to 264 V AC/200 V power supply model/
Rated supply frequency	50/60 Hz
Allowed supply frequency fluctuation range	48 to 63 Hz
Maximum power consumption	250 VA (printer on)/150 VA (printer off)
Withstand voltage (across power supply and ground)	1.5 kV AC, for one minute
Insulating resistance (across power supply and ground)	500 V DC, 10 MΩ or greater
External dimensions	Approximately 370 mm (W) × 260 mm (H) × 183 mm (D) (excluding handles and protrusions)
Weight	Approximately 6.8 kg (including 8-channel high-speed isolation module)

General Specifications (701830: DL716 AC model)

Rated supply voltage	100 to 120 V AC/200 to 240 V AC (automatic switching)
Allowed supply voltage fluctuation range	90 to 132 V AC/180 to 264 V AC
Rated supply frequency	50/60 Hz
Allowed supply frequency fluctuation range	48 to 63 Hz
Maximum power consumption	250 VA (printer on)/150 VA (printer off)
Withstand voltage (across power supply and ground)	1.5 kV AC, for one minute
Insulating resistance (across power supply and ground)	500 V DC, 10 MΩ or greater
External dimensions	Approximately 355 mm (W) × 260 mm (H) × 305 mm (D) (excluding handles and protrusions)
Weight	Approximately 12.4kg (including 16-channel high-speed isolation module)

General Specifications (701831: DL716 DC model) NEW

Rated supply voltage	12 V DC
Allowed supply voltage fluctuation range	10 to 16 V DC
Supply input connector type	Round 3P connector
Supply input terminals	BAT+ (12 V)/BAT-(GND)/FG (ground) Power supply (BAT±) and FG (ground) are isolated.
Battery connector cable	Alligator clip on one end (2 meters)
Cable connector	Round 3P soldered type
Maximum power consumption	250 VA (printer on)/150 VA (printer off)
Withstand voltage (across power supply and ground)	30 V AC, for one minute
Insulating resistance (across power supply and ground)	500 V DC, 10MΩ or greater
External dimensions	Approximately 355 mm (W) × 260 mm (H) × 305 mm (D) (excluding handles and protrusions)
Weight	Approximately 12.4 kg (including 16-channel high-speed isolation module)

Specifications for AC/DC converter (700984) for DL716 DC model

Application	The DL716 DC 12V model (701831) is used on AC lines. The converter serves to convert the AC power (100 to 120 V/200 to 240 V AC) to DC power (13 V-23 A DC).
(Input)	
Rated supply voltage	100 to 120 V AC/200 to 240 V AC (automatic switching)
Allowed supply voltage fluctuation range	90 to 132V AC/180 to 264 V AC
Rated supply frequency	50/60 Hz
Allowed supply frequency fluctuation range	48 to 63 Hz
Maximum power consumption	600 VA
(Output)	
Rated output voltage	13 V
Maximum output current	23 A
Output connector	Round 3P connector
External dimensions	230 mm (W) × 110 mm (H) × 250 mm (D)
Weight	Approximately 6 kg
Operating environment temperature	5°to 40°C
Humidity	20% to 85% RH (no condensation)

Input Plug-in Module Specifications

High-speed isolation module (with 12-bit A/D resolution) (701855)

Number of input channels	1
Input couplings	DC, AC, GND
A/D conversion resolution	12 bits (maximum 16 bits with box average on)
Maximum sampling rate	10 MS/s
Input type	Isolated unbalanced
Frequency band (-3 dB)*1	DC to 1 MHz
Input range (8 div/display)	
In combination with 700929 probe	200 V/div to 50 mV/div (1/2/5 steps)
Main unit alone	20 V/div to 5 mV/div (1/2/5 steps)
Maximum input voltage (1 kHz or less)	
In combination with 700929 probe (between tip H and L*3)	850 V (DC + AC peak) (CAT I & II, 600 Vrms)
Main unit only (between H and L*4)	250 V (DC + AC peak) (CAT I & II, 177 Vrms)
Maximum allowable in-phase voltage	
In combination with 700929 probe (between probe tip H or L and case ground*5)	400 Vrms (CAT I & II) 600 Vrms (specification other than EN61010-1)
Main unit only (between signal L and case ground*6)	42 V (DC + AC peak) (1 kHz or less) (CAT I & II, 30 Vrms)
DC accuracy*1(20 V/div to 10 mV/div) (main unit only)	±(1.5% of 8 div + offset voltage accuracy)
Offset voltage accuracy*1	±(0.04% of offset voltage range + 1% of setting)
Input impedance	1 MΩ ±1% (approximately 30 pF)
Connector type	Isolated BNC connector
Input filters	OFF, 500 kHz, 50 kHz, 5 kHz, 500 Hz

High-speed module (with 12-bit A/D resolution) (701856)

Number of input channels	1
Input couplings	DC, AC, GND
A/D conversion resolution	12 bits (maximum 16 bits with box average on)
Maximum sampling rate	10 MS/s
Input type	Nonisolated unbalanced
Frequency band (-3 dB)*1	DC to 4 MHz
Input range (8 div/display)	20 V/div to 5 mV/div (1/2/5 steps)
Maximum input voltage (1 kHz or less)	250 V (DC + AC peak) (CAT I & II, 177 Vrms)
DC accuracy*1	
20 V/div to 20 mV/div	±(1.2% of 8 div + offset voltage accuracy)
Offset voltage accuracy*1	±(0.04% of offset voltage range + 1% of setting)
Input impedance	1 MΩ ±1% (approximately 30 pF)
Connector type	BNC connector
Input filters	OFF, 500kHz, 50kHz, 5kHz, 500Hz

High-resolution high-voltage isolation module (701852)

Number of input channels	1
Input couplings	DC, AC, GND
A/D conversion resolution	16 bits (8000LSB/div)
Maximum sampling rate	100 kS/s
Input type	Isolated unbalanced
Frequency band (-3 dB)*1	DC to 40 kHz (200 V/div to 100 mV/div) DC to 30 kHz (50 mV/div)
Input range (8 div/display)	200 V/div to 50 mV/div (1/2/5 steps)
Maximum input voltage (1 kHz or less)(between signal H and L*7)	850 V (DC + AC peak) (CAT I & II, 600 Vrms)
Maximum allowable in-phase voltage (between signal H or L and case ground*8)	400 Vrms (CAT I & II) 600 Vrms (specification other than EN61010-1)
DC accuracy*1 *2 (excluding when input filter is set to Auto)	
200 V/div to 100 mV/div	±(0.5% of 8 div)
50 mV/div	±(1% of 8 div)
Input impedance	1 MΩ ±1%
Connector type	Safety connector (banana plug)
CMRR	80 dB (50/60 Hz) or higher
Temperature coefficient	(excluding when input filter is set to Auto)
Zero point	±(0.02% of 8 div)/°C
Gain	±(0.02% of 8 div)/°C
Input filters (LPF)	OFF, Auto, 4 kHz, 400 Hz, 40 Hz
FFT anti-aliasing filter	OFF, 40 kHz to 20 Hz

High-resolution isolation module (701853)

Number of input channels	1
Input couplings	DC, AC, GND
A/D conversion resolution	16 bits (8000LSB/div)
Maximum sampling rate	100 kS/s
Input type	Isolated unbalanced
Frequency band (-3 dB)*1	DC to 40 kHz (20 V/div to 10 mV/div) DC to 30 kHz (5 mV/div)
Input range (8 div/display)	20 V/div to 5 mV/div (1/2/5 steps)
Maximum input voltage (1 kHz or less)(between signal H and L*9)	100 V (DC + AC peak) (CAT I & II, 70 Vrms)
Maximum allowable in-phase voltage (between signal H or L and case ground*10)	600 Vrms 400 Vrms (CAT I & II)
DC accuracy*1 *2 (excluding when input filter is set to Auto)	
20 V/div to 20 mV/div	±(0.3% of 8 div)
10 mV/div	±(0.5% of 8 div)
5 mV/div	±(1% of 8 div)
Input impedance	1 MΩ ±1%
Connector type	Safety connector (banana plug)
CMRR	80 dB (50/60 Hz) or higher
Temperature coefficient	(excluding when input filter is set to Auto)
Zero point	±(0.02% of 8 div)/°C
Gain	±(0.02% of 8 div)/°C
Input filters (LPF)	OFF, Auto, 4 kHz, 400 Hz, 40 Hz
FFT anti-aliasing filter	OFF, 40 kHz to 20 Hz

High-resolution voltage/RMS isolation module (701857) NEW

(Waveform measurement mode and RMS measurement mode)	
Input channels	1
Input coupling	DC/AC/GND/RMS-DC/RMS-AC
A/D conversion resolution	16 bits (4000LSB/div)
Maximum sample rate	100 kS/s
Input type	Isolated unbalanced
Input range (8 div display)	200 V/div to 50 mV/div (steps of 1, 2, or 5)
Maximum input voltage (1 kHz or less) (across signal H and L)	850 V (DC + ACpeak)
Maximum allowed in-phase voltage (across signal H or L and case ground)	500 Vrms (CAT I & II) 600 Vrms (specification outside EN61010-1 ratings)
Input impedance	1 MΩ ± 1%
Connector type	Safety connector (for banana plugs)
Temperature coefficient	
Zero point	±0.02% of 8 div/°C
Gain	±0.02% of 8 div/°C
Input filters	OFF/100 Hz/1 kHz
(Waveform measurement mode)	
DC accuracy*1	±0.5% of 8 div
Frequency band *1	DC to 40 kHz
(-3 dB attenuation point when sinewave with amplitude equivalent to ±3 div is input)	
CMRR	80 dB (50 Hz/60 Hz) or greater (typical)
(RMS measurement mode)	
Measurement range	DC, 40 Hz to 10 kHz
DC accuracy*1*15	±1% of 8 div
AC accuracy*1*15	
Sinewave input	±1.5/% of 8 div (40 Hz to 1 kHz)
Crest factor of 2 or less	±2.0% of 8 div (40 Hz to 1 kHz)
Crest factor of 3 or less	±3.0% of 8 div (40 Hz to 1 kHz)
Response time	Rise (from 0 to 90% of 8 div) 100 ms (typical) Fall (from 100 to 10% of 8 div) 200 ms (typical)
Crest factor	3 or less

Temperature Module (701860)

Number of input channels	1
Data updating rate	Approximately 135 Hz
Input type	Isolated unbalanced
Applicable sensor	Thermocouple
Measurement range/accuracy*1 *11	

Type	Measurement range	Accuracy
K	–200 to 1300°C	±(0.2% of reading + 1.5°C)
E	–200 to 800°C	except : –200 to 0°C : ±(0.5% of reading ± 1.5°C)
J	–200 to 1100°C	
T	–200 to 400°C	
L	–200 to 900°C	
U	–200 to 400°C	
N	0 to 1300°C	

R	0 to 1700°C	±(0.2% of reading + 3°C)
S	0 to 1700°C	except : 0 to 200°C : 8°C 200 to 800°C ± 5°C
B	400 to 1800°C	±(0.2% of reading + 4°C) except : 400 to 700°C : ± 8°C
W	0 to 2300°C	±(0.2% of reading + 3°C)
KP vs Au7Fe	0 to 300K	0 to 50K : ± 8.0K 50 to 300K : ± 4.5K

Maximum input voltage (1 kHz or less)
(between signal H and L) 42 V (DC + AC peak) (CAT I & II, 30 Vrms)
Maximum allowable in-phase voltage (1 kHz or less)
(between signal H or L and case ground)
42 V (DC + AC peak) (CAT I & II, 30 Vrms)
Input connector: Binding post
Input impedance: Approximately 1 MΩ
Vertical resolution: 0.1°C
Temperature coefficient: ±(0.02% of FS)/°C
Reference junction compensation accuracy (when input terminal temperature is balanced)
±1°C (K, E, J, T, L, U, N)
±1.5°C (R, S, B, W)
±1K (KP vs Au7Fe)
Input filters: OFF, 2 Hz, 8 Hz

Logic input module (701870)

Number of inputs: 16 (8 bits × 2)
Maximum sampling rate: 10 MS/s (response speed depends on the response time of the logic probe)
Compatible probes: 700986, 700987

High-speed logic probe (700986)

Number of inputs: 8
Input type: Nonisolated (common ground for all bits; logic module and bits share common ground)
Maximum input voltage (1 kHz or less)
(between probe tip and case ground)
42 V (DC + AC peak) (CAT I & II, 30 Vrms)
Response time: 1 µs or less
Input impedance: Approximately 100 kΩ
Threshold level: Approximately 1.4 V

Isolation logic probe (700987)*13

Number of inputs: 8
Input type: Isolated (all individual bits are isolated)
Input connector: Safety connector (banana plug) × 8
Input switching capability: AC/DC input switching for each bit
Input signal display: H/L for each bit can be checked on LEDs
Applicable input ranges
DC input: H/L detection for 10 V DC to 250 V DC
AC input: H/L detection (50/60 Hz) for 80 V AC to 250 V AC
Threshold levels
DC input: 6 V DC ±50%
AC input: 50 V AC ±50%
Response times
DC input: 1 ms or less
AC input: 20 ms or less
Maximum input voltage (1 kHz or less)
(between H and L of each bit)
250 Vrms*12 (CAT I & II)
Maximum allowable in-phase voltage (1 kHz or less)
(between H or L of each bit and ground)
250 Vrms*12 (CAT I & II)
Maximum allowable voltage between bits
250 Vrms*12 (CAT I & II)
Insulating resistance: Approximately 100 kΩ

Strain module (701880)

Number of input channels: 1
Input types: DC bridge input (automatic balancing), balanced differential input, DC amplifier (floating)
Used gauge resistance: 120-1000Ω
Gauge rate: 1.90-2.20 (variable in steps of 0.01)

Measurement Ranges and Accuracy

Measurement range	Measurable range (FS)	Accuracy*1 *14
1000 × 10^{-6} strain	±1000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
2000 × 10^{-6} strain	±2000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
5000 × 10^{-6} strain	±5000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
10000 × 10^{-6} strain	±10000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
20000 × 10^{-6} strain	±20000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain

Bridge voltages: 2 V, 5 V DC (variable)*1
Automatic balancing method: Electronic auto-balancing
Automatic balancing range: ±10000 × 10^{-6} strain
Maximum allowable input voltage
5 V (DC + AC peak)
Input resistance: 10 MΩ or higher
Frequency band: DC to 20 kHz (-3 dB)*1
Temperature coefficients
Zero point: ±5 × 10^{-6} strain/°C (input-converted; after auto-calibration)
Gain: ±(0.05% of FS)/°C (after auto-calibration)
Internal filter: Low-pass filter; can be turned ON/OFF.
Cutoff frequencies: 10 Hz, 100 Hz, 1 kHz
Cutoff characteristic: –12 dB/oct
A/D resolution: 14 bits
Maximum sampling rate: 100 kS/s
Maximum allowable in-phase voltage
42 V (DC + AC peak) (CAT I & II; 30 Vrms)
CMRR: Minimum 80 dB (50/60 Hz, signal source resistance of 1 kΩ)
Input connector: NDIS standard
Bridge resistance: External
Recommended bridge heads
700932 (bridge resistance of 120 Ω)
700933 (bridge resistance of 350 Ω)
Included accessory: Cable connector (A1002JC)
Weight: Approx. 200 g

Caution! Only connect a strain measurement bridge (bridge head) or strain gauge converter.

Bridge Head (700932, for 701880)

Bridge resistance: 120 Ω
Wiring type: 1 gauge / 1 gauge 3 wire / 2 gauge (neighbor side) / 2 gauge (opposite side) / 2 gauge 3 wire (opposite side) / 4 gauge
External dimension: Approx. 37 mm (W) × 97 mm (H) × 30 mm (D)
Weight: Approx. 85 g (main unit only)
Included accessory: NDIS cable (5 m)

Bridge Head (700933, for 701880)

Bridge resistance: 350 Ω
Wiring type: 1 gauge / 1 gauge 3 wire / 2 gauge (neighbor side) / 2 gauge (opposite side) / 2 gauge 3 wire (opposite side) / 4 gauge
External dimensions: Approx. 37 mm (W) × 97 mm (H) × 30 mm (D)
Weight: Approx. 85 g (main unit only)
Included accessory: NDIS cable (5 m)

Strain module (with shunt cal) (701885)

Number of input channels: 1
Input types: DC bridge input (automatic balancing), balanced differential input, DC amplifier (floating)
Used gauge resistances: 120-1000 Ω (bridge voltage of 2 V DC)
350-1000 Ω (bridge voltages of 5 V, 10 V DC)
Gauge rate: 1.90-2.20 (variable in steps of 0.01)

Measurement Ranges and Accuracy

Measurement range	Measurable range (FS)	Accuracy*1 *14
1000 × 10^{-6} strain	±1000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
2000 × 10^{-6} strain	±2000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
5000 × 10^{-6} strain	±5000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
10000 × 10^{-6} strain	±10000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain
20000 × 10^{-6} strain	±20000 × 10^{-6} strain	±1% of FS ±40 × 10^{-6} strain

Bridge voltages: 2 V, 5 V, 10 V DC (variable)*1
Automatic balancing method: Electronic auto-balance
Automatic balancing range: ±10000 × 10^{-6} strain
Maximum allowable input voltage: 10 V (DC + AC peak)
Input resistance: Minimum 10 MΩ
Frequency band: DC to 20 kHz (-3 dB)*1
Temperature coefficients
Zero point: ±5 × 10^{-6} strain/°C
(input-converted; after auto-calibration)
Gain: ±(0.05% of FS)/°C (after auto-calibration)
Internal filter: Low-pass filter; can be turned ON/OFF.
Cutoff frequencies: 10 Hz, 100 Hz, 1 kHz, 4 kHz
Cutoff characteristic: –12 dB/oct
A/D resolution: 14 bits
Maximum sampling rate: 100 kS/s
Maximum allowable in-phase voltage: 42 V (DC + AC peak) (CAT I & II, 30 Vrms)
CMRR: Minimum 80 dB (50/60 Hz, signal source resistance of 1 kΩ)
Input connector: D-Sub 9-pin
Bridge resistance: External
Recommended bridge head: 700967 (bridge resistance of 120 Ω)

	700968 (bridge resistance of 350 Ω)
Weight	Approx. 200 g

Caution! Only connect a strain measurement bridge (bridge head) or strain gauge converter.

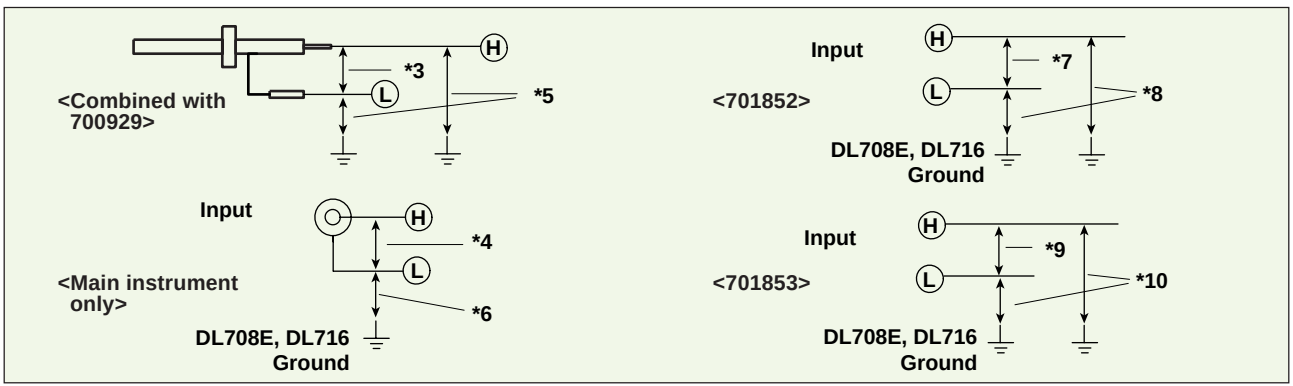
Bridge Head (700967, for 701885)

Gauge resistance	120 Ω
Wiring type	1 gauge / 1 gauge 3 wire / 2 gauge (neighbor side) / 2 gauge (opposite side) / 2 gauge 3 wire (opposite side) / 4 gauge
External dimension	Approx. 50 mm (W) × 104 mm (H) × 29 mm (D)
Weight	Approx. 100 g (main unit only)
Included accessory	D-Sub 9-pin cable (5 m)

Bridge Head (700968, for 701885)

Gauge resistance	350 Ω
Wiring type	1 gauge / 1 gauge 3 wire / 2 gauge (neighbor side) / 2 gauge (opposite side) / 2 gauge 3 wire (opposite side) / 4 gauge
External dimension	Approx. 50 mm (W) × 104 mm (H) × 29 mm (D)
Weight	Approx. 100 g (main unit only)
Included accessory	D-Sub 9-pin cable (5 m)

*1 Under reference operating conditions
*2 At position center



*11 Excludes reference set temperature compensation accuracy.
*12 ACPeak voltage must not exceed 353 V, and DC voltage must not exceed 250 V.
*13 Excludes measurement leads. For signal measurements, 366961 (up to 42 V), or 758917 and either 758922 or 758929 is required.
*14 Gauge rate is 2 (accuracy for strain module only).
*15 When input signal is over as 10% of range (8 div) or more.